PATENT SPECIFICATION

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560,858

PROVISIONAL SPECIFICATION

Improvements in or relating to Masts and the like

We, CONSTRUCTORS LIMITED, a British Company, of Nickel Works, Tyburn Road, Erdington, Birmingham, 24, WILLIAM CHARLES SCRIVENER, a British Subject, of 20, Willmott Road, Little Sutton, Sutton Coldfield, and ALFRED GEORGE BREWER, a British Subject, of 36, Haselor Road, Sutton Coldfield, do hereby declare the nature of this invention to be as follows:—

This invention is for masts and the like and has for its object the provision of a mast or the like which is simple in its manufacture, quickly assembled and easily erected by the minimum number of personnel.

The present invention consists of a mast built up of a series of rigid members connected together by joints constructed and arranged so as to unite the members into a unit which when arranged upright forms, in conjunction with guy ropes or the like connected to the upper end of each member, a flexible mast capable of sustaining a heavy vertical crushing load.

It will be appreciated that where reference is hereinafter made to rigid tubular members, the said members may be of any desired shape or configuration without in any way departing from the spirit of the present invention.

In the case of a light mast, a suitable joint between adjacent members comprises a flange having radially directed open slots formed in the periphery at predetermined distances around the circumference thereof connected to the end of a member, for example by a spigot arranged to extend into a socket in the end of a member, said spigot being provided at the free end thereof. By such a construction each member is uniformly formed at each end thereof with a flange provided with a series of radially directed slots. When it is desired to connect together two members so constructed, the ends are brought into close proximity with one another and there is introduced between the said ends a plate provided with lugs on either side thereof which are arranged in planes perpendicular to the plane of the plate. The lugs are spaced around the plate and from the axis thereof at distances corresponding to the distances between the slots formed in the flanges and the distances of the slots from the axis of each member. The lugs on the plate are shaped so that they are provided with a portion overhanging the plate and directed towards the axis of the plate. The plate is so constructed that when placed between the ends of two adjacent members the flanges upon the respective members may be disposed so that the slots correspond with the lugs on the plate whereby an axial movement of the two members towards one another bring the flanges of the members into contact with opposite sides of the said plate, whereupon the members may be given a part turn about their axis so as to bring the unslotted portion of the flanges beneath the overhanging portions of the lugs, thereby locking each member to the plate and to one another, thus preventing the two members from being unintentionally separated from one another in a longitudinal direction. There is provided upon the plate a hole arranged to receive a split pin which is preferably attached to the plate by means of a chain so that the pin can be inserted into the hole in the plate so as to extend through slots formed in the flanges of the two members and in such a position prevent the members from rotating relatively to the plate sufficiently to bring the slots of the flanges adjacent to the lugs on the plate and thus allow the members to become unintentionally disconnected.

It will be appreciated that the plates which are arranged to extend between the successive members are uniform in character and therefore interchangeable as is also the case with the flanged spigots which extend into the ends of the members.

If a series of members are connected together in the manner indicated above, it will be found that a unit is formed in which the successive members are held together longitudinally.

To the underside of each plate and preferably forming an extension of each of

[Price 1/-]

the lower lugs of the plate are fixed hooks to which guy ropes are securable so as to hold the upper end of each member in a predetermined position. Thus it will be seen that by providing guys at the joint where adjacent members are connected together, it is possible to arrange successive members so as to extend vertically from the ground with the axes of the members in alignment with one another.

An alternative construction to that described above is to form closed slots in the plate which are arranged to receive lugs permanently attached to the end of the guy ropes so that when the lugs are arranged to extend through the closed slots in the plate and through the open slots in the flanged spigots and the members are given a part turn about the longitudinal axes thereof, the lugs are locked in the plates and serve to connect the ends of adjacent members together. Such an alternative construction provides additional means whereby the guys may be connected to the plates without the necessity of providing loose parts which are liable to be lost.

Thus it will be seen that according to the present invention there is provided a mast which is simple in its construction, easy to erect and simple to maintain because the number of parts necessary are small and their manipulation extremely simple.

Dated this 21st day of December, 1943.

G. F. REDFERN & CO.,
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Dominion Street, London, E.C.2,
Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in or relating to Masts and the like

We, CONSTRUCTORS LIMITED, a British Company, of Nickel Works, Tyburn Road, Erdington, Birmingham, 24, WILLIAM CHARLES SCRIVENER, a British Subject, of 20, Willmott Road, Little Sutton, Sutton Coldfield, and ALFRED GEORGE BREWER, a British Subject, of 36, Haselor Road, Sutton Coldfield, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to masts and like structures of the type which are built up of a series of non-telescopic rigid sheet metal tubular members arranged coaxially one above the other so as to provide an upright structure which is held erect solely by the aid of lateral supports such as guy ropes.

Tubular masts or like structures wherein one member of a pair of adjacent members is arranged to be moved into or out of the other for the greater part of its length are known. Such constructions are referred to as telescopic masts, the members being held in their extended position by a friction joint. Such a mast or like tubular structure has the disadvantage that such a friction joint can unintentionally become loosened whereupon the members will become displaced relatively to one another in a longitudinal direction so as to cause the structure to collapse and such a tubular structure does not and is not intended to fall within the scope of the present invention.

Further, there has hitherto been proposed various types of masts and like structures of the type which is built up of a series of non-telescopic rigid sheet metal tubular members arranged coaxially one above the other so as to provide an upright unitary structure which is held erect solely by the aid of lateral supports such as guy ropes, wherein each pair of adjacent members are connected together by means which prevent the said members being unintentionally displaced relatively to one another in a longitudinal direction. Thus, for example, it has been proposed to provide a two-part sleeve overlapping the junction between two members, each part of the sleeve being semi-circular in cross-section and the parts are drawn together by bolts extending through the adjacent members and diametrically through each part of the sleeve.

Again, it has been proposed to provide an outwardly extending flange upon the end of each adjacent member of a mast and to provide a nut and bolt connection between said flanges in which the bolts extend in the longitudinal direction of the members.

According to the present invention, there is provided a mast or like structure of the type specified, wherein a series of non-telescopic rigid sheet metal tubular members are constructed so as to be arranged in line as an upright hollow unitary structure and each pair of adjacent members are connected together by a plate in the form of a connecting link arranged between the said members, which plate, in conjunction with means fixed relatively to the members and ex-

tending exteriorly thereof, is adapted to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

Again according to the present invention, there is provided a mast or like structure of the type specified, wherein a series of non-telescopic rigid sheet metal tubular members are constructed so as to be arranged as an upright hollow unitary structure, wherein each pair of adjacent members are connected together by a link arranged exteriorly of the said members so as to extend in the longitudinal direction of the members and engage with extensions fixed relatively to said members and directed laterally from the exterior surface of the said members, and means arranged coaxially with the said lateral extensions are movable about the axes of the said extensions to connect the link to the said members in such a manner as to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

The invention is more particularly described with reference to the accompanying drawings, in which:—

Figures 1 and 2 illustrate in plan and elevation one construction of link for connecting together two adjacent members of a mast of the type hereinbefore specified; and

Figures 3 and 4 illustrate a modified construction of link to that illustrated in Figures 1 and 2.

Referring to Figures 1, 2, 3 and 4, only the link connecting together short lengths of a pair of adjacent members of a mast of the type specified is shown but it will be obvious to a person skilled in the art that where it is desired to connect more than one pair of members together in accordance with the present invention additional members may be added in a like manner to that described with reference to the members illustrated in the drawings.

Referring to Figures 1 and 2, there is illustrated a suitable method of connecting together one pair of adjacent non-telescopic tubular members of a light mast. The link between two members 4 and 5 comprises an outwardly directed flange 7 fixed relatively upon the end of each member and having radially directed open slots 8 (Figure 4) formed in the periphery thereof at predetermined distances around the circumference. The flange 7 is formed upon a spigot 9 arranged to extend into a socket formed in the end of a member. By such a construction each member 4 and 5 is uniformly formed at each end thereof with means in the form of a flange 7 fixed relatively to the member and exteriorly thereof. Each flange is provided with a series of radially directed slots 8. When it is desired to connect together the two members 4 and 5, the ends are brought into close proximity with one another and there is introduced between the flanges 7 of adjacent members 4 and 5 a connecting link in the form of a plate 10 provided with lateral projections 11 on either side thereof which are arranged in planes perpendicular to the plane of the plate 10. The projections 11 are spaced around the plate 10 and from the axis thereof at distances corresponding to the distances between the slots 8 formed in the flanges 7 and the distances of the slots 8 from the axis of each member. The projections 11 on the plate 10 are provided with overhanging portions 12 which overhang the plate and are directed towards the axis thereof. The plate 10 is so constructed that when placed between the flanges 7 on the ends of the two adjacent members 4 and 5 with the flanges 7 upon the respective members disposed so that the slots 8 correspond with the projections 11 on the plate 10 an axial movement of the two members 4 and 5 towards one another so as to bring the flanges 7 of the members 4 and 5 into contact with opposite sides of the plate 10 will connect the adjacent members so that they cannot be disconnected by a lateral movement of the members relatively to one another, the plate forming a socket for each member. If the members 4 and 5 or the plate 10 is given a part turn about their axes so as to bring the overhanging prtions 12 of the projections 11 above the unslotted portions of the flanges 7, there will be effected a connection between the adjacent pairs of members 4 and 5 which prevents any substantial unintentional displacement of the members 4 and 5 from one another in a longitudinal direction. There is formed in the plate 10 a hole arranged to receive a split pin 13 which is preferably attached to the plate 10 by means of a chain 14. The pin 13 can be inserted into the hole in the plate 10 so as to extend through two adjacent slots 8 formed in the pair of flanges 7 of the two members 4 and 5 and in such a position prevent the members 4 and 5 from rotating relatively to the plate 10 sufficiently to bring the slots 8 of the flanges 7 adjacent to its projections 11 on the plate 10 and thus allow any substantial displacement of the members 4 and 5 relatively to one another in a longitudinal direction.

It will be appreciated that the plates 10 which are arranged to extend between the adjacent members and constitute the connecting link between the same are

uniform in character and therefore interchangeable.

If a series of members is connected together in the manner indicated above, it will be found that a unitary structure is formed in which each adjacent pair of members are connected together by means which prevent any substantial unintentional longitudinal displacement of the said members relatively to one another in a longitudinal direction.

Hooks 15 are arranged upon the underside of each plate 10 and preferably form an extension of each of the lower projections 11 of the plate. Guy ropes 5^a are securable to said hooks 15 by eyes 41 in such a position as to hold the ends of two adjacent members in a predetermined position. Thus it will be seen that by providing guys at the joint where adjacent members are connected together, it is possible to arrange successive members so as to extend vertically from the ground with the axes of the members in alignment with one another.

An alternative construction of link connection between adjacent members 4 and 5 is illustrated in Figures 3 and 4.

This construction consists of a plate 45 provided with slots or apertures 44 arranged to receive rods 46 having means (in the shape of hook-shaped portions 46^a) associated therewith which are movable (after the rods have been threaded through the open slots 48 in the flanges 49^a of the spigot 49 and the slots or apertures 44 in the plate 45) about the axes of the members 4 and 5 to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction and in addition they are movable under the tension of the guys 5^a to cause the plate 45 to bear against the adjacent flanged ends of the two members 4 and 5.

The plate 45 is prevented from being unintentionally moved about the axis thereof so as to bring the slots 44 thereof into register with the open slots 48 in the flange 49^a by the introduction of a split pin 50 into a hole in the plate 45 which is in register with slots in the flanges 49^a.

When the members 4 and 5 are brought into contact with opposite faces of the plate 45 they are connected together in a manner in which either the projections 11 or the rods 46 prevent any substantial lateral displacement of the members relatively to one another.

The construction hereinbefore referred to with reference to Figures 1 and 2 or Figures 3 and 4 provides a mast or like structure of the type built up of a series (namely one pair 4 and 5) of non-telescopic rigid sheet metal tubular members arranged coaxially one above the other so as to form an upright structure which is held erect by the aid of guys 5^a operatively connected through hooks 15 and eyes 41 to the members 4 and 5, wherein the members 4 and 5 are connected together by a plate 10 or 45 in the form of a connecting link arranged between the said members 4 and 5 which plate 10 or 45 in conjunction with means in the form of flanges 7 or 49^a fixed relatively to the said members and extending exteriorly thereof is adapted to prevent any substantial unintentional displacement of the members 4 and 5 relatively to one another in a longitudinal direction.

Again it will be appreciated that in either of the arrangements described and illustrated with reference to Figures 1 and 2 or 3 and 4 there exists a mast or like structure of the type hereinbefore specified wherein a series (namely a pair) of non-telescopic rigid sheet tubular members 4 and 5 are constructed so as to be arranged upright as a hollow unitary structure, wherein each pair of adjacent members 4 and 5 are connected together by a link 11 or 46 arranged exteriorly of the said members 4 and 5 so as to extend in the longitudinal direction of the members and engage with extensions 7 and 49^a fixed relatively to said members 4 and 5 and directed laterally from the exterior surface of said members and means (the plate 10 or 45) arranged coaxially with said lateral projections 7 or 49^a are movable about the axes of the said extensions to connect the link 11 or 46 to the said members 4 and 5 in such a manner as to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

It will be appreciated by those skilled in the art that although two specific methods of carrying the invention into effect have been hereinbefore described, many variations of the invention may be conceived which fall within the scope of the appended Claims.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that we are aware of Applications No. 16506 of 1943 (Serial No. 560,851) and No. 16508 of 1943 (Serial No. 560,853) and do not claim anything claimed therein but what we claim is:—

1. A mast or like structure of the type specified, wherein a series of non-telescopic rigid sheet metal tubular members are constructed so as to be arranged in line as an upright hollow unitary structure and each pair of adjacent members

are connected together by a plate in the form of a connecting link arranged between the said members, which plate, in conjunction with means fixed relatively to the members and extending exteriorly thereof, is adapted to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

2. A mast or like structure as claimed in Claim 1, wherein the plate is provided with lateral projections arranged to extend through slots in the said members and wherein means carried by the said projections (for example, overhanging portions thereof) are movable to lock the plate to the adjacent members so as to prevent any substantial unintentional displacement of the said members relatively to one another in a longitudinal direction.

3. A mast or like structure as claimed in Claim 2, wherein the slots comprise radially directed slots in flanges disposed upon the adjacent ends of the said members and the lateral projections comprise lugs mounted on the plate, the combination being such that when the plate is arranged between the flanges and in a predetermined position relatively thereto, the members can be moved longitudinally towards one another to permit the lugs to extend through the slots in the flanges and can be given a rotational movement which will cause overhanging portions of the lugs to lie over unslotted portions of the flanges and so prevent any substantial unintentional displacement of the members from one another in a longitudinal direction.

4. A mast or like structure as claimed in Claim 1, wherein the plate is provided with slots or apertures arranged to receive rods having means associated therewith which are movable relatively to both the said members and the plate so as to cause the plate to bear against the adjacent ends of the said members and in addition prevent any substantial unintentional displacement of the said members relatively to one another in a longitudinal direction.

5. A mast or like structure as claimed in Claim 4, wherein the rods are provided with hook-shaped portions which are constructed so as to extend through radially directed slots in flanges disposed upon adjacent ends of the said members and through radially directed slots in the plate, the arrangement being such that the hook-shaped portions of the rods are movable about the axis of the flanges on the said members in such a manner that when guy ropes or the like are attached to the said rods and pulled up tightly the ends of the said members bear against the plate and in addition are attached thereto so as to prevent any substantial unintentional displacement of the members relatively to one another.

6. A mast or like structure of the type specified, wherein a series of non-telescopic rigid sheet metal tubular members are constructed so as to be arranged as an upright hollow unitary structure, wherein each pair of adjacent members are connected together by a link arranged exteriorly of the said members so as to extend in the longitudinal direction of the members and engage with extensions fixed relatively to said members and directed laterally from the exterior surface of the said members, and means arranged coaxially with the said lateral extension are movable about the axes of the said extensions to connect the link to the said members in such a manner as to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

7. A mast or like structure as claimed in Claim 6, wherein the longitudinally directed link is provided at least at one end thereof with a substantially hook-shaped portion arranged to engage with the lateral extension on one of the members so as to provide a connection between one end of the link and the said member.

8. A mast or like structure as claimed in Claim 6 or Claim 7, wherein the lateral extension on a member which engages with the link is arranged at right angles to the axis of said member.

9. A mast or like structure as claimed in Claim 1, wherein two adjacent members are connected together by a bayonet joint.

10. A mast or like structure wherein adjacent members are first moved relatively to one another in a longitudinal direction to effect a connection which prevents any substantial relatively lateral displacement of the ends of the members, the members being thereafter connected together in a manner set forth in any one of the preceding Claims so as to prevent any substantial unintentional displacement of the members relatively to one another in a longitudinal direction.

11. A mast or like structure in which a series of rigid non-telescopic sheet metal tubular members are constructed so that when arranged upright they form in conjunction with guys or the like, a mast or like structure in which any substantial unintentional displacement of an adjacent pair of members in a longitudinal direction is prevented by a construction, arrangement and operation of parts sub-

stantially as hereinbefore set forth with reference to Figures 1 and 2 or Figures 3 and 4 of the accompanying drawings.

Dated this 22nd day of December, 1943.
G. F. REDFERN & CO.,
Chartered Patent Agents,
Redfern House,
Dominion Street, London, E.C.2,
Agents for the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1944.

FIG. 1.

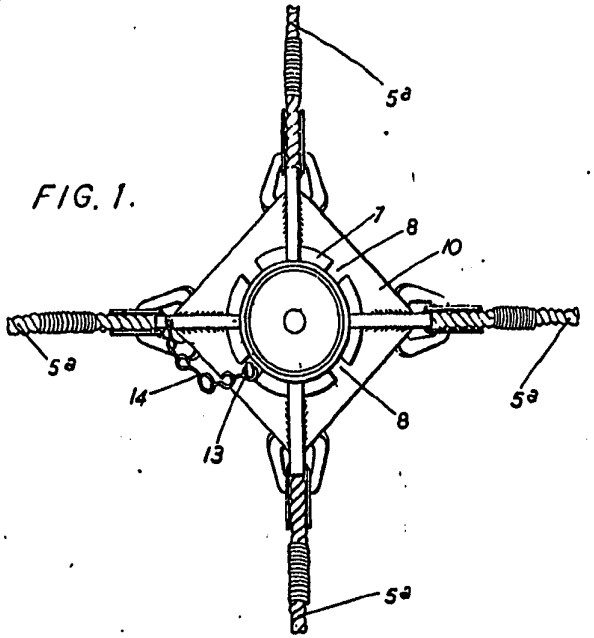


FIG. 2.

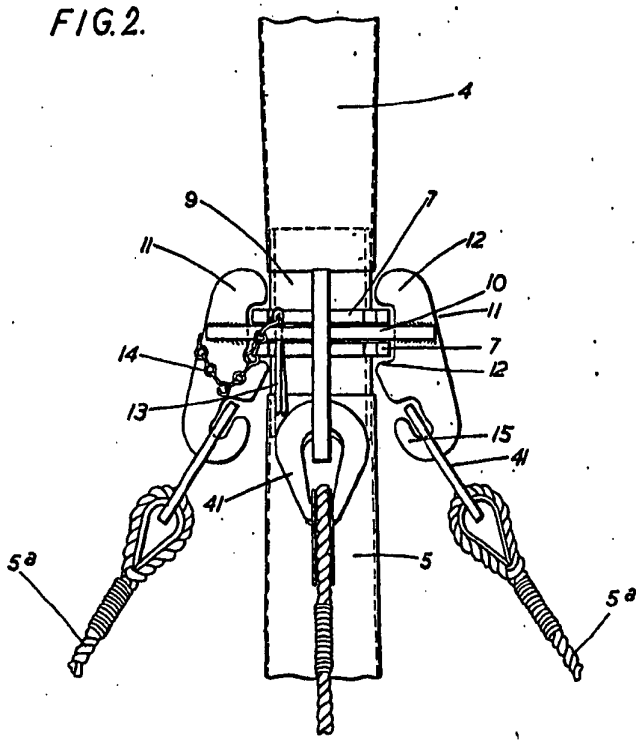


FIG. 3.

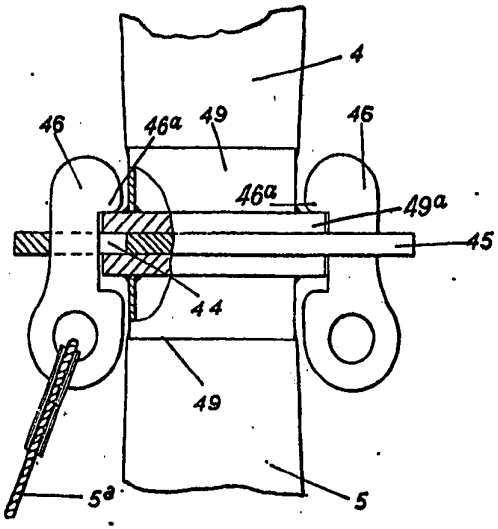
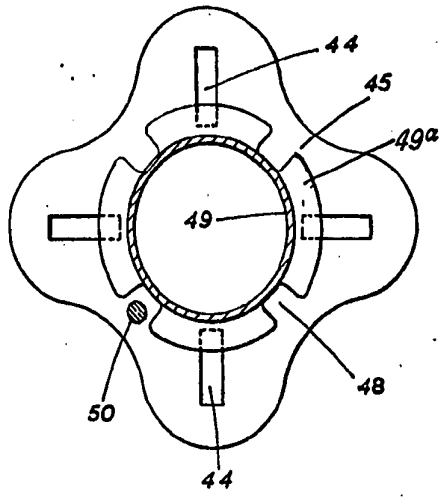


FIG. 4



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560,858 COMPLETE SPECIFICATION

SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

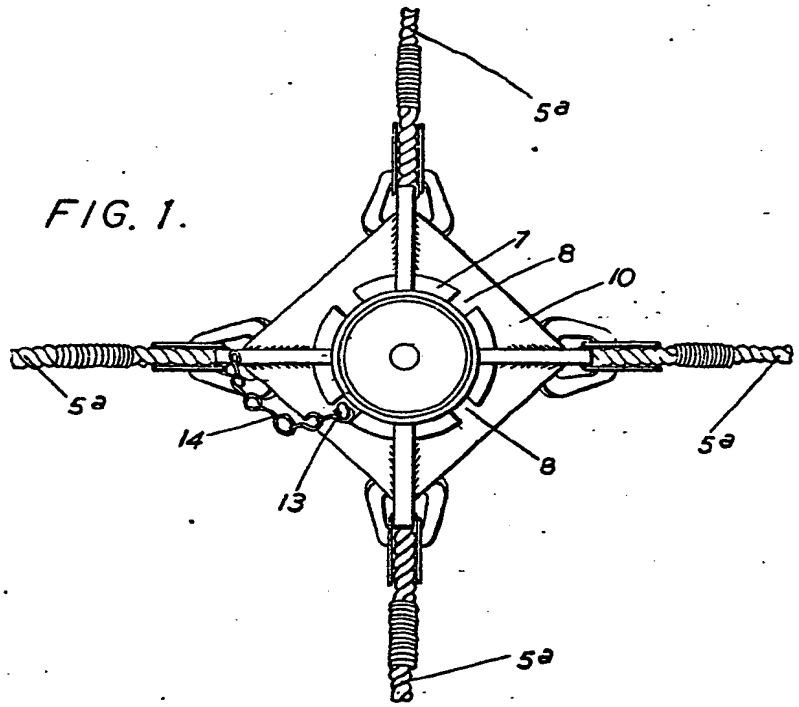
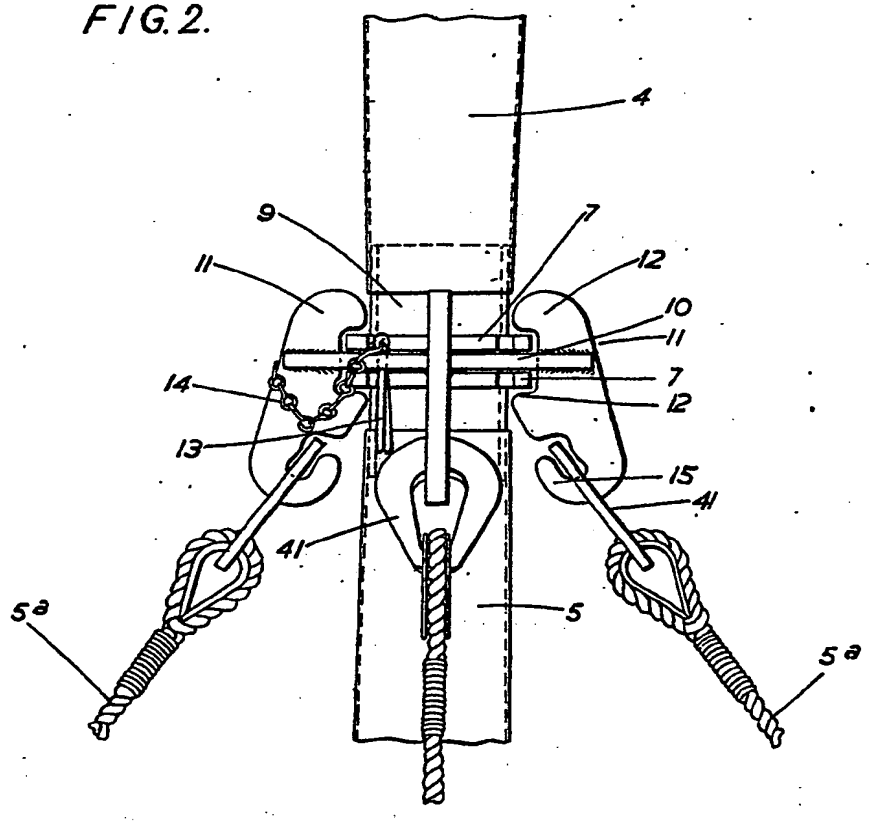


FIG. 2.



T I

FIG. 3.

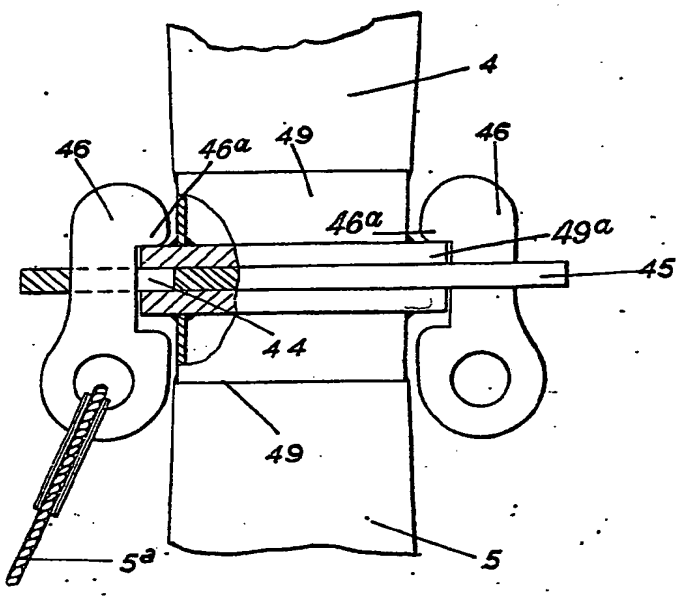
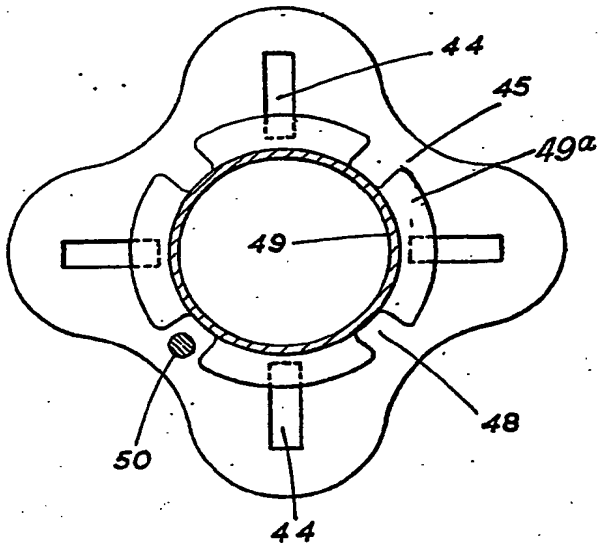


FIG. 4



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